J. New York Entomol. Soc. 104(1–2):79–82, 1996

THE BIOLOGY OF *NOLA PUSTULATA* (WALKER) (LEPIDOPTERA: NOCTUIDAE; NOLINAE)[1]

Tim L. McCabe

Biological Survey, New York State Museum, State Education Department, Albany, New York 12230

Abstract.—The larva and pupa of *Nola pustulata* (Walker) are described and illustrated. *Lyonia ligustrina* (L.) DC. [Ericaceae] is established as a host. The moth is much more restricted in distribution than its food plant. The species is univoltine, overwintering as an egg that is deposited on the twigs of the food plant. Hatching coincides with bud burst. A keel-shaped cocoon is produced and adults emerge in early June. A parasitoid, *Distatrix* sp. (Hymenoptera: Braconidae), and a predator, *Nabis inscriptus* Kirby (Heteroptera: Nabidae) are reported.

Most moths will freely oviposit even in the absence of their food-plant. The resulting first-instar larvae can be given a selection of potential food-plant species. The most difficult host associations to unravel are those where the appropriate food-plant's presence is necessary to induce oviposition. For a small species whose ova overwinter, such as *Nola pustulata,* the problems are compounded by low survival rates in culture. Through field work I was fortunate in discovering late instar larvae of *Nola pustulata* (Walker, 1865) on the leaves of *Lyonia ligustrina* (L.) D.C. [Ericaceae] very early in the spring at Hawley Bog in western Massachusetts. Later I found first instar larvae on the buds of *L. ligustrina* in the Pine Bush near Albany, New York. The host plant occurs from New York south to Florida and Texas (Fernald, 1950) a much larger range than that of *N. pustulata. Nola pustulata* is a species normally associated with boggy or swampy habitats from central New York to the mountains of North Carolina (Franclemont, 1960).

Nola species are typically monophagous with overwintering eggs or pupae, depending on the species (Franclemont, 1960). *Nola pustulata* is univoltine with adults appearing in June and July. Eggs, laid singly or in twos and threes in crevices on the twigs of *Lyonia,* remain dormant until spring. Hatching occurs in the spring, coincident with bud burst. The newly eclosed larva crawls to a bud and feeds on the outside, occasionally entering a bud large enough to accommodate its size. The larva develops rapidly, maturing in as little as 14 days under field conditions. The mature larva uses fragments of bark and silk to spin a keel-shaped cocoon (Fig. 8) typical of the Nolinae, Sarrothripinae and Chloephorinae (Hampson, 1900; Franclemont, 1960). In addition, Richards (1932) considered these subfamilies to be related by tympanul similarities. Butler (1989) gives a detailed description of *Meganola spodia* Franclemont cocoon construction agrees with that of *N. pustulata. Nola pustulata* pupa lacks the spines on the fifth abdominal segment found in the sarrothripine *Characoma nilotica* (Rogenhofer) (Mosher, 1969).

Parasitoids and predators recorded include *Distatrix* sp. (Hymenoptera: Braconidae), and *Nabis inscriptus* Kirby (Heteroptera: Nabidae). Two *Distatrix* sp. emerged on May

---

[1] Contribution number 733 of the New York State Science Service.

Figs. 1–2. *Nola pustulata.* 1. Adult (inset), wingspan 18 mm. 2. Mature larva (head to the left) on twig of *Lyonia ligustrina,* length of caterpillar 14 mm.

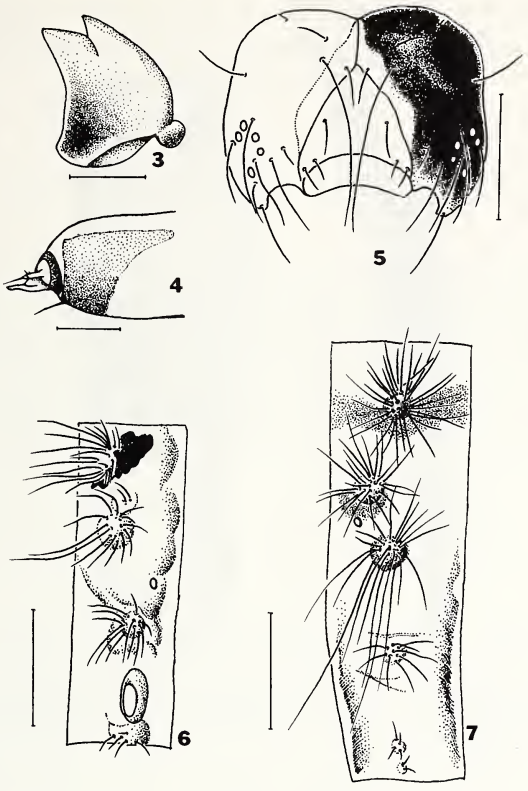
25, 1980 from a last instar larvae that had been reared from the Hawley bog site. The *Distatrix* specimens agree very well with Mason's (1981) description of the genus, but appear to be an undescribed species. The *Nabis* was observed feeding on a larva on May 15, 1982 at the Pine Bush site.

MATURE LARVA

Length 14 mm (N = 12). Head black, adfrontal area lightly pigmented, frons black (not darkened in Fig. 5 in order to show setae). Mouthparts: mandible with two prominent teeth (Fig. 3); hypopharynx as illustrated (Fig. 4). Prothorax (Fig. 6) with verrucae D accompanied by heavily chitinized remnant of prothoracic shield. Thorax and abdomen with moderately hairy verrucae; a broad white middorsal stripe bordered by a black to gray-black subdorsal stripe running through D verrucae (see Fig. 7); lateral region, between subdorsal stripe and L verrucae, orange-brown. A few examples with SD verrucae black, giving appearance of a series of black lateral spots (as in Fig. 2). Other larvae with SD verrucae concolorous orange-brown; white below L verrucae. Abdominal proleg 3 absent as in other Nolidae (Franclemont, 1960; Kitching, 1984). Abdominal prolegs well developed on segments 4, 5, 6 & 10. Crochets a uniordinal, homoideous mesoseries with an average of 16 crochets per proleg.

COCOON AND PUPA

Cocoon: Boat-shaped with prominent "keel", 12 mm long (Fig. 8). Pupa: Nearly parallel sided, 8 mm long (N = 2); juncture of A6 & A7 slightly broadened (Fig. 9).



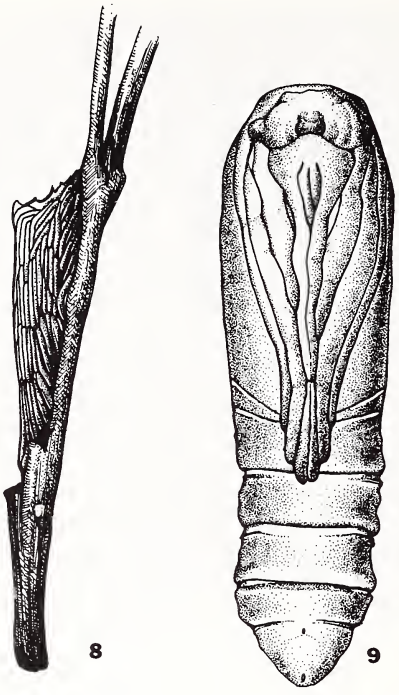
Figs. 3–7. Last instar larva of *Nola pustulata.* 3. Oral face of left mandible. Scale line = 0.25 mm. 4. Hypopharyngeal complex, lateral view. Scale line = 0.14 mm. 5. Head capsule, frontal view. 6. Prothorax, semidiagramatic view from middorsal line to midventral line. 7. First abdominal segment, semidiagrammatic view from middorsal line to midventral line (anterior to the left in figs. 6 & 7). Scale lines = 0.50 mm for Figs. 5–7.

Cremaster absent. No spines on fifth abdominal segment. Prothoracic and mesothoracic legs extending from the eye-piece nearly to, or beyond, the caudal margin of A5.

Specimens examined: Larvae (5): Hawley bog, Franklin Co., Mass., lat. 42.34.31 long. 73.53.27, 21 May 1980, elev. 540 meters (tlm 80-41). Larval parasitoids emerged 25 May 1980; (6) Pine Bush, Albany, Co., N.Y., lat. 42.42.43 long. 74.52.53, 15 May 1982, elev. 100 meters (tlm 82-24); (1) same locale, 17 May 1981 (tlm 81-27); Pupae (2): same locale, 21 May 1985, elev. 100 meters (tlm 85-4).

ACKNOWLEDGMENTS

I thank Patricia Eckel of the Buffalo Natural History Museum for the illustrations. Voucher specimens are in the New York State Museum.



Figs. 8–9. *Nola pustulata.* 8. Cocoon on twig, lateral view (total length 12 mm). 9. Pupa, ventral view (total length 8 mm).

LITERATURE CITED

Butler, L. 1989. Observations on *Meganola spodia* Franclemont (Lepidoptera: Noctuidae) with a description of the mature larva. Proc. Entomol. Soc. Wash. 9(4):615–619.

Fernald, M. L. 1950. Gray's Manual of Botany. D. Van Norstrand Co. 1632 pp.

Franclemont, J. G. 1960. Nolidae. *in:* W. T. M. Forbes, Lepidoptera of New York and neighboring states. Cornell University Agric. Exp. Sta. Mem. 370:50–55.

Hampson, G. F. 1900. Catalogue of the Arctiadae (Nolinae, Lithosianae) in the collection of the British Museum. London. Vol. 2, pp. 1–589.

Kitching, A. J. 1984. An historical review of the higher classification of the Noctuidae (Lepidoptera). Bull. Brit. Mus. Nat. Hist. 49(3):153–234.

Mason, W. R. M. 1981. The polyphyletic nature of *Apanteles* Foerster (Hymenoptera: Braconidae): A phylogeny and reclassification of Microgastrinae. Mem. Entomol. Soc. Can. 115:1–147.

Mosher, E. 1969. Lepidoptera Pupae. Five collected works on the pupae of North American Lepidoptera. Entomological Reprint Specialists. East Lansing, Michigan. 323 pp.

Richards, A. G. 1932. Comparative skeletal morphology of the noctuid tympanum. Entomol. Am. 13:1–43.

Walker, F. 1865. List of the specimens of lepidopterous insects in the collection of the British Museum. Vol. 33. London. Edward Newman. p. 795.

Received 11 August 1994; accepted 19 September 1996.